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**United States Patent** [19]  
**Levitan**

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[45] **Date of Patent:** **Jul. 9, 1996**

[54] **VIRTUAL PERSONAL CHANNEL IN A TELEVISION SYSTEM**

[76] **Inventor:** Gutman Levitan, 101 Grove St., Stamford, Conn. 06901

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[51] **Int. Cl.<sup>6</sup>** ..... H04N 7/03

[52] **U.S. Cl.** ..... 348/1; 348/2; 348/6; 348/10

[58] **Field of Search** ..... 348/1, 2, 5, 6, 348/12, 13, 906, 10; 455/2, 5.1

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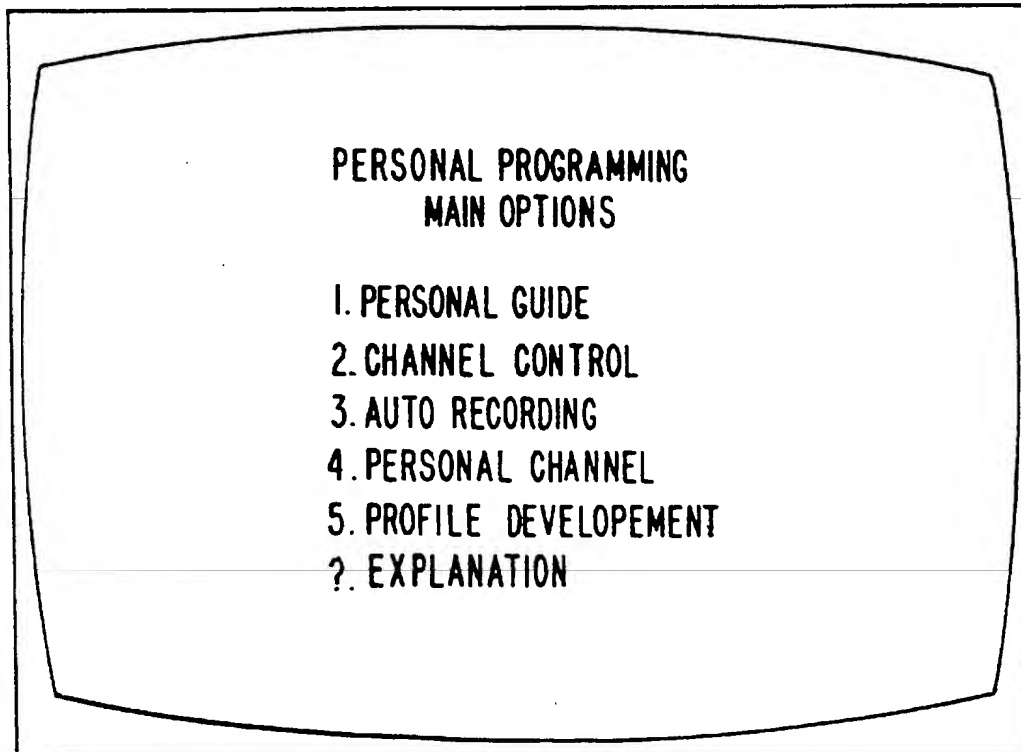
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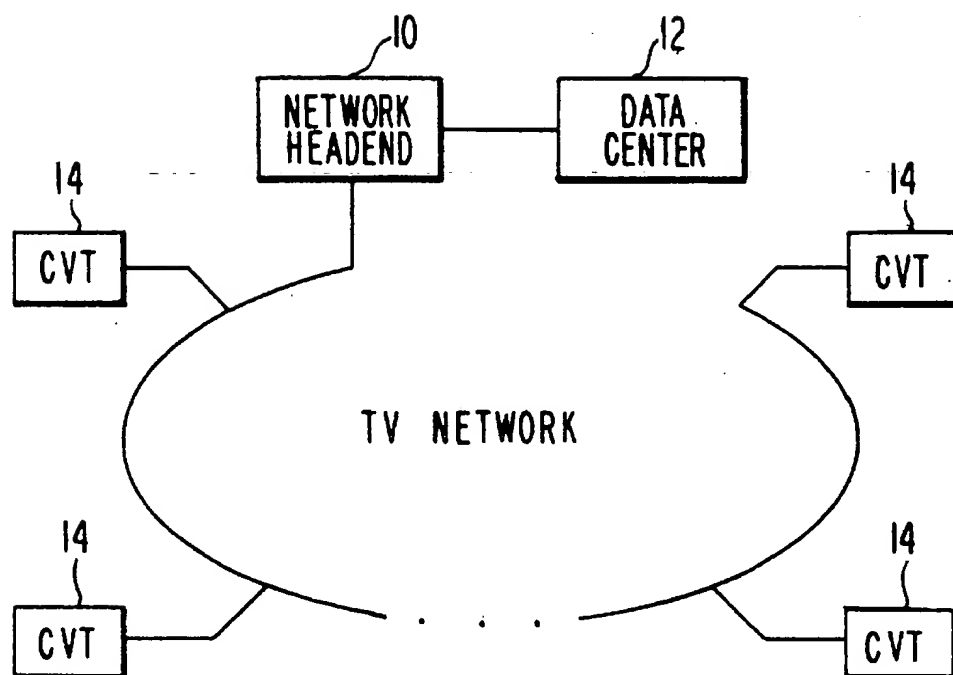
*Primary Examiner*—Victor R. Kostak  
*Attorney, Agent, or Firm*—Ilya Zborovsky

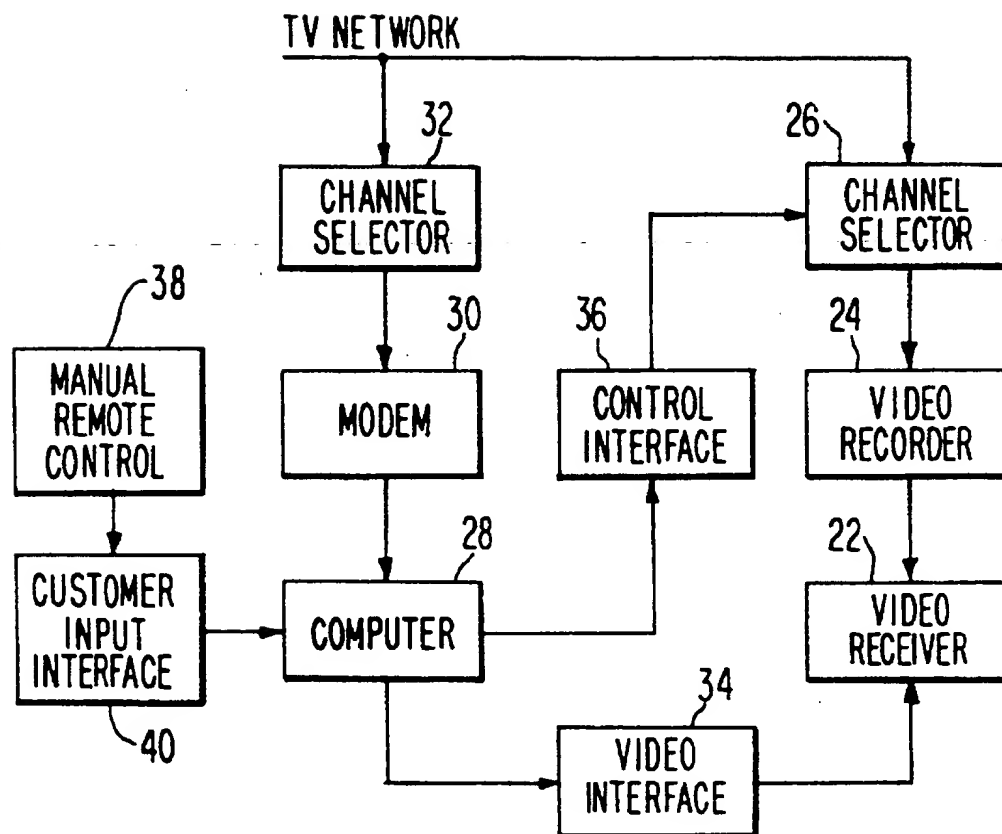
[57] **ABSTRACT**

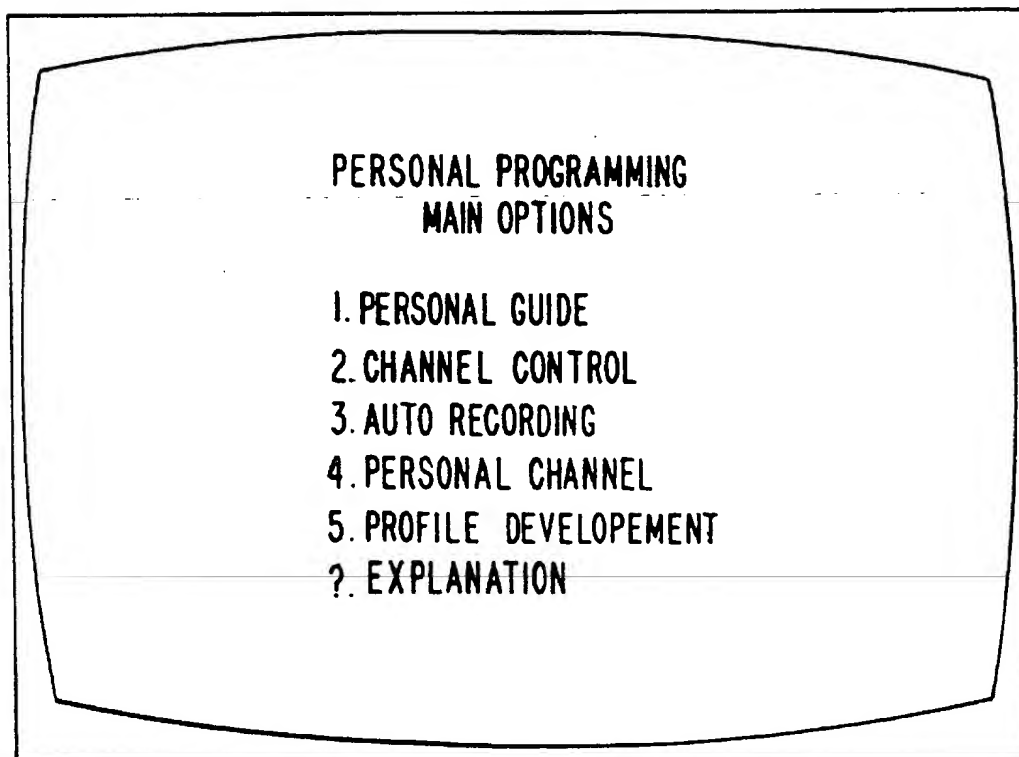
An apparatus for providing a customer of a television system with virtual personal channel which being selected delivers a television program of the most personal interest no matter on which channel and at what time the program is physically transmitted. Descriptive and time/channel data of scheduled TV programs are broadcasted through a communication medium from the system headend to customer terminal prior to transmission of programs themselves. In customer terminal all scheduled TV programs are evaluated by a computer that stores customer profile data and controls customer video receiver and video recorder. Whenever customer selects personal channel the computer switches the video receiver to a physical channel on which a program having the best evaluation is transmitted. The best program of the day or the week is recorded and can also be presented as current program of personal channel.

**2 Claims, 5 Drawing Sheets**

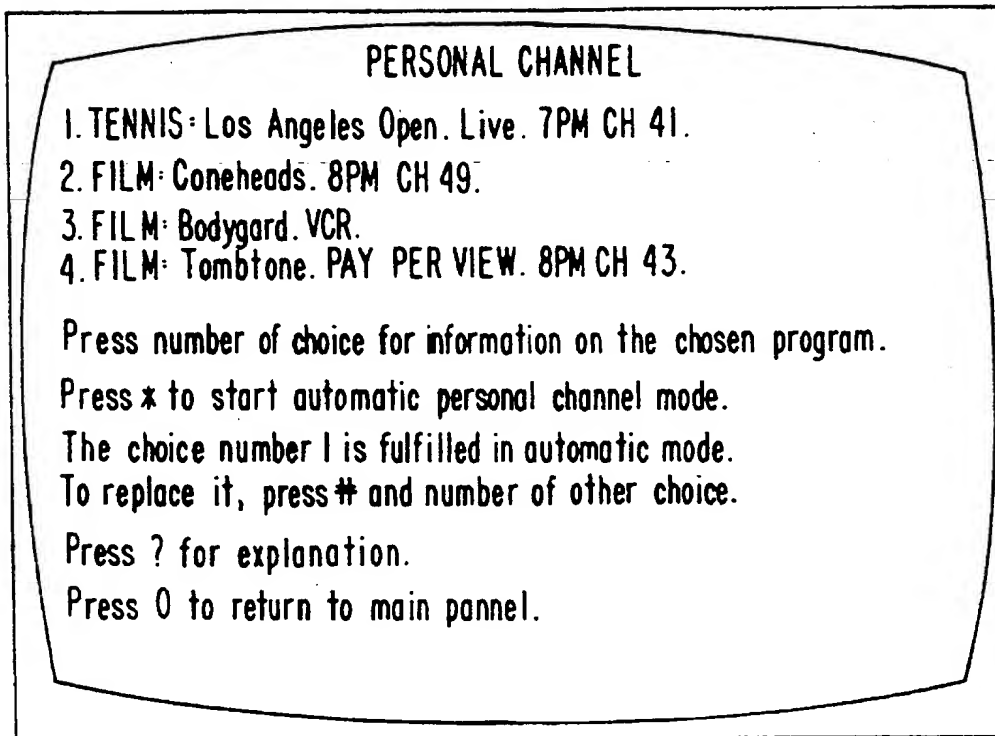


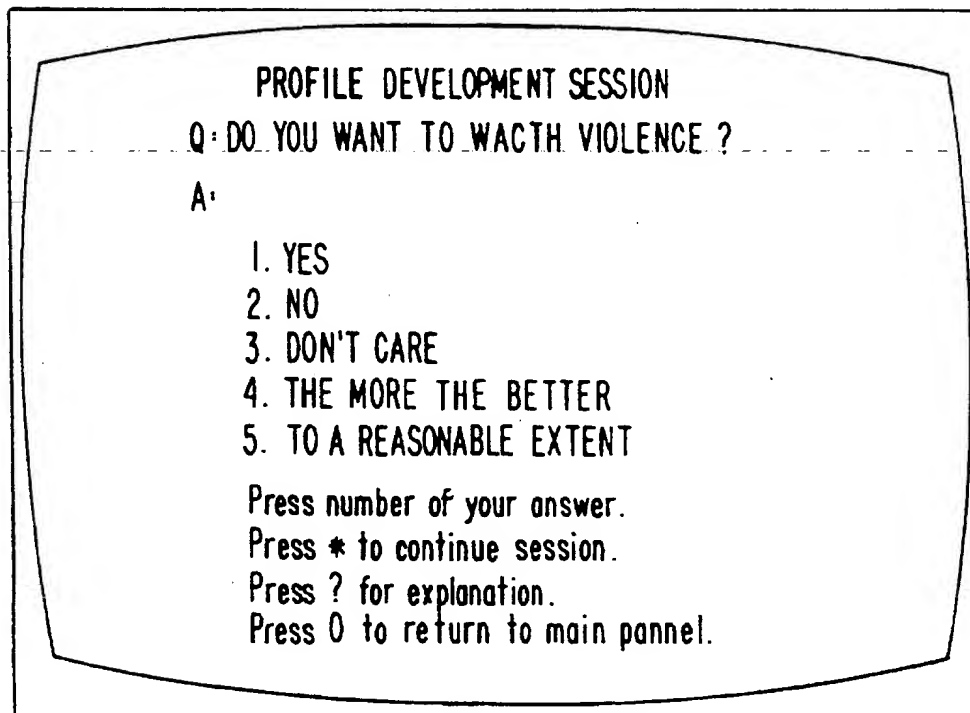
**FIG. 1**

*FIG. 2*



**FIG.3**

**FIG. 4**



PROFILE DEVELOPMENT SESSION

Q: DO YOU WANT TO WATCH VIOLENCE ?

A:

1. YES
2. NO
3. DON'T CARE
4. THE MORE THE BETTER
5. TO A REASONABLE EXTENT

Press number of your answer.  
Press \* to continue session.  
Press ? for explanation.  
Press 0 to return to main panel.

**FIG. 5**

## VIRTUAL PERSONAL CHANNEL IN A TELEVISION SYSTEM

### BACKGROUND OF THE INVENTION

The present invention relates to multichannel television systems, which are typically cable TV networks, and addresses the problem of utilizing their new channel capacity. It is evident that browsing TV channels and reading a guide magazine become inefficient with 800 or so channels and in order to efficiently utilize the new capacity a new medium is required. This invention presents such a medium, an automated personal programming system that incorporates TV set, VCR and computer to provide each customer with a virtual personal channel that delivers programs of the most personal interest at the most convenient time.

At the network headend the medium is supported by a data processing and transmitting system that stores descriptive and time-channel data on scheduled TV programs, and transmits the data through the network prior to the programs. At the customer end the preview data is processed by a computer that is a part of customer terminal. The computer stores a customer profile data representing customer interests and preferences. It evaluates each program to be transmitted in respect to the customer profile, makes a choice and if the terminal is switched to an automatic mode, provides a real time control of channel selector, TV set and VCR to deliver a selected program to the customer.

The automated personal programming can be used for both conventional one-way TV services and new two-way or interactive services such as pay per view, video on demand and teleshopping. The system passes time and stress of choice to computer and what is even more important, it is able to read and analyze much more information on available programs, products and services and as a result to make a better choice individually providing each customer with the most enjoyable entertainment and the most relevant information while protecting from everything which is going to be boring, annoying, useless or unacceptable for any reason.

### SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide cable TV subscribers with automated channel control service implemented by means of transmitting data on scheduled TV programs prior to the programs and processing the data in a computerized customer terminal that selects programs evaluating their descriptive data in respect to a customer profile and uses time and channel data to switch the channel selector to a proper channel at a proper time in order to keep the video receiver set for reception of selected programs.

Another object is a similar system for automated recording. The system compares transmitted descriptive preview data with customer profile data to make a best choice among programs to be transmitted on all available channels 24 hours a day, seven days a week. Then it uses time and channel data of selected program to switch the channel selector to the specified channel, turn on VCR and set it into recording mode in the beginning of the program, and stop recording, rewind the tape and turn off power at the end of the program.

A further object of the invention is a compressed personal guide system which selects and presents information on scheduled programs of the most interest for the customer. At the network headend the service is supported by a multimedia

system that stores and-transmits formatted data intended for computer analysis along with unformatted information, such as text, sound, still and moving picture intended for customer attention. At the customer end, the formatted data is evaluated in respect to the customer profile to make first, second, third and so on choices. Then activated by a customer request the system uses TV set as a computer video monitor to present multimedia information on chosen programs.

The compressed personal guide combined with the automatic channel selection or the automatic recording facilitates customer control in the automated environment supplying customer with information on chosen programs and providing means to replace the first, intended for fulfillment choice by one of other choices. The combination of the guide, the automatic channel selection, and the automatic recording, implements a virtual personal channel system which, when activated, keeps customer terminal permanently set for delivering the best program selected from a plurality of currently transmitted and previously recorded programs.

### BRIEF DESCRIPTION OF THE DRAWING FIGURES

FIG. 1 is a block diagram of a TV network with automated personal programming;

FIG. 2 is a block diagram of a computerized video terminal providing compressed personal guide, automatic channel selection and automatic recording.

FIG. 3 shows the main panel of automated programming system on TV screen;

FIG. 4 shows an example of personal channel panel;

FIG. 5 shows an example of panel in profile development session.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The automated personal programming can be implemented in any multichannel TV system and it is really not important how many channels the system exploits because only one and may be not full time additional channel is required for preview data transmission. The system central part or headend 10 is connected to a data processing center 12 where information on TV programs and services such as movies, shows, news is stored in a multimedia database (FIG. 1). The information includes both formatted data intended for computer analysis and unformatted presentations intended for customer attention. The presentations comprise text, voice, still picture and short fragments of TV programs. The formatted data is organized in a special way so that it could be processed by a computer program in a computerized video terminals (CVT) 14 connected to the network at the customer end.

When a TV program is scheduled for transmission its descriptive information is retrieved from the database, supplemented with data on transmission time and channel and transmitted through the network prior to the program. In customer terminals the preview data of each program is evaluated in respect to customer profile and as a result, each terminal makes its own choice before the scheduled TV programs are transmitted. The customer profile is developed in an interactive session, which will be described hereinafter, and privately stored in the personal system thus inaccessible from any other point of the network including headend.

FIG. 2 shows a block diagram of a computerized video terminal. It includes a conventional video receiver (TV set) 22 and a conventional video recorder (VCR) 24 connected to the network through a conventional channel selector (cable box) 26. A computer 28 is connected to the network through a modem 30 and a channel selector 32 set to a channel used in the network for previewing data transmission. To output signals representing multimedia information the computer is connected to the video receiver through a video interface 34, a device widely used in video game technology. This connection is implemented using the antenna input of the video receiver or the video signal input, if available, and therefore does not require any change to existing TV sets.

A control interface device 36 converts the computer output signals into remote control signals directed to the channel selector and the video recorder. While every video receiver has its own channel selector, it may be connected to the network through the channel selector of a video recorder or a cable box. All those channel selectors have remote control circuits and whether a customer video terminal consists of a TV set alone or a TV set coupled with a VCR and/or a cable box, the computer can switch channels with the control interface 36 without any wiring and any change to existing TV sets, VCRs and cable boxes. The same is true for VCR control: the remote control 36 handled by computer turns power on and off, starts and stops recording, rewinds and plays the tape in the same way as a conventional manual remote control does. Therefore in such an implementation the additional equipment necessary for personal programming is autonomous and compatible with existing TV sets, VCRs and cable boxes. The equipment can be added to existing home entertainment centers to provide subscribers with automated channel control, automated recording and compressed personal guide.

Customer input to the system is provided through a manual remote control device 38 similar to those of TV set, VCR and cable box, and an interface device 40 that converts infrared signals of the remote control into signals processed by the computer. When a button ON is pressed on the remote control, the video receiver 22, the video recorder 24 and the channel selector 26 are set under computer control while pressing a button OFF returns the video terminal to its conventional mode. Under computer control the video receiver shows the main pannel of the personal programming system (FIG. 3). If customer selects personal channel option (pressing the button 4 on the remote control) he or she will see a personal channel pannel (FIG. 4) that shows first, second and so on choices made by computer in respect to the customer profile. Now pressing \* invokes automatic personal channel mode in which a TV program of the first choice will be on the screen. However, as the pannel explains, before starting the mode the customer can get information on the choices presented and replace the first choice by other one. The multimedia information combines text, voice, still picture and short fragments of the chosen TV programs—like any conventional preview presentation. The difference is that the presentation is individually selected for each customer, stored in computer and presented on request.

The personal channel option, when invoked, keeps the whole video terminal set for presenting a best program selected from a plurality of currently transmitted and previously recorded programs. The channel control (option 2 on main pannel) does the same but ignores VCR while auto recording (option 3) is dedicated to VCR control only. The auto recording pannel shows what has been chosen for recording among programs to be transmitted during the

week, explains how to get information on chosen programs and replace a program of the first choice by one of other choices.

Personal guide (option 1) pannel looks like one on FIG. 4 however it presents not only choices made on currently transmitted and previously recorded programs but also on future programming. Customer can browse his personal guide, get short and extended information on selected programs and make correction changing choices intended for fulfillment. All pannels are provided with a help facility: pressing ? on manual remote control brings explanation what is the pannel for and what different options on the pannel exactly mean.

The personal programming system does not work without customer profile. Therefore the first thing to be done after the system installation is selection of the option 5 from the main menu (FIG. 3) to start a profile development session. During the session the computer presents a sequence of questions and multiple choice of numbered answers like those on FIG. 5. Pressing a number of his choice on the manual remote control the customer provides computer with information that will be used for evaluation of TV programs. If customer is uncertain about a question and/or how a particular answer will be used in the evaluation process he can press ? to get explanation. The other option is to skip the question. Once selected answer will be highlighted on the screen for future profile correction which can be made at any time. There are two types of questions in the session: direct that target particular aspects of TV programs such as violence and adult language, and indirect that collect personal data such as age, education, ethnic origin and zip code in order to use results of demographic research in the profile development. To make the session shorter and to adjust it to customer, following questions may differ depending on previous customer responses.

While certain novel features of this invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes in the forms and details of the devices illustrated and their operation can be made by those skilled in the art without departing from the spirit of the invention.

I claim:

1. An apparatus for providing a customer of a television system, in addition to regular television channels, with virtual personal channel which being selected for a customer television receiver delivers a television program of the most personal interest automatically chosen among programs concurrently transmitted on all available physical channels of the system, said apparatus comprising:

communication means at a television system headend for broadcasting descriptive and time/channel data of scheduled television programs prior to transmission of the programs, said descriptive and time/channel data formatted for computer analysis;

means at customer end for receiving said descriptive and time/channel data formatted for computer analysis;

means at customer end for storing customer profile data representing customer interests and preferences;

program evaluation means at customer end coupled to said receiving means and to said storing means for processing said formatted descriptive data of scheduled television programs and providing evaluations of the television programs in respect to said customer profile data; and

real-time control means at customer end coupled to said program evaluation means and to said customer tele-



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vision receiver for determining in correspondence with said television program evaluations and said television program time/channel data which of the programs currently scheduled for transmission has the best evaluation and, only when personal channel is selected by the customer, switching the customer television receiver to the channel of the television system on which the program having the best evaluation is scheduled for transmission.

2. An apparatus as claimed in claim 1 and further comprising a video recording means coupled to said real-time

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control means, said real-time control means determining which of the television programs scheduled for transmission during a specified period of time has the best evaluation, providing automatic recording of the program at the time when the program is transmitted and providing automatic reproducing of the recorded program as the program of personal channel when personal channel is selected and the evaluation of the recorded program is better than evaluation of any program currently scheduled for transmission.

\* \* \* \* \*



US005532735A

**United States Patent** [19][11] **Patent Number:** **5,532,735****Blahut et al.**[45] **Date of Patent:** **Jul. 2, 1996**[54] **METHOD OF ADVERTISEMENT  
SELECTION FOR INTERACTIVE SERVICE**[75] **Inventors:** Donald E. Blahut, Holmdel; William  
M. Schell, Watchung, both of N.J.; Guy  
A. Story, New York, N.Y.; Edward S.  
Szurkowski, Maplewood, N.J.[73] **Assignee:** AT&T Corp., Murray Hill, N.J.[21] **Appl. No.:** 236,286[22] **Filed:** Apr. 29, 1994[51] **Int. Cl.<sup>6</sup>** ..... H04N 7/14[52] **U.S. Cl.** ..... 348/13; 348/7; 455/412;  
455/5.1[58] **Field of Search** ..... 348/12, 13, 6,  
348/7, 10; 455/4.2, 5.1, 6.1, 6.3; H04N 7/13,  
7/16[56] **References Cited****U.S. PATENT DOCUMENTS**

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**Primary Examiner**—Victor R. Kostak**Assistant Examiner**—Juan G. Acosta**Attorney, Agent, or Firm**—David M. Rosenblatt[57] **ABSTRACT**

Described is a technique for an interactive television ("ITV") system wherein viewers are allowed to select a desired level of advertisements with which they are provided. The technique comprises transmitting to a interactive services subscriber location a program and a set of advertisements (collectively referred to as a "show"). The set of advertisements is selected based upon an input from a user associated with the interactive services subscriber location. The input comprises an indicator of an amount of advertisements in the set of advertisements. Another feature of the ITV system described is that it allows for adjusting an amount of a bill of a subscriber to interactive television services based upon the amount of advertisements viewed in a show.

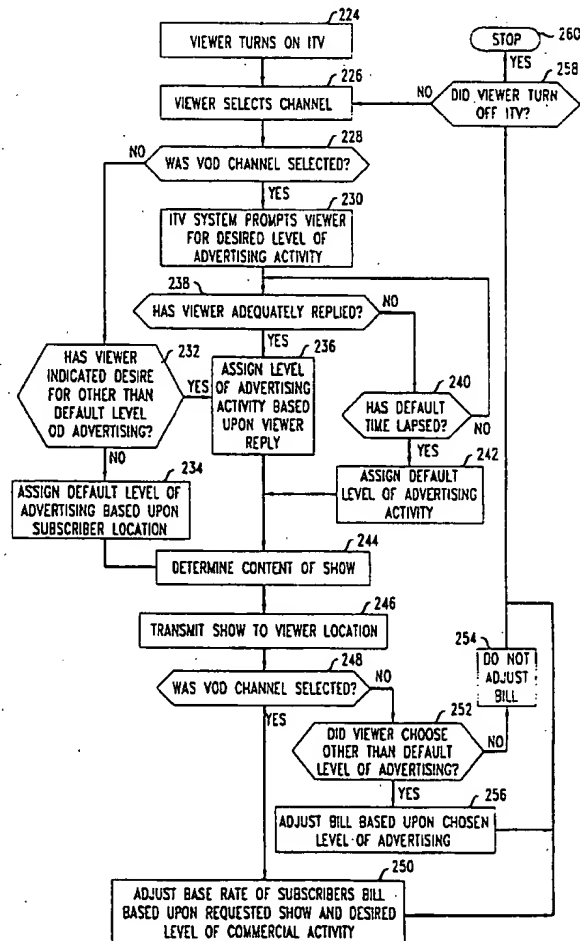
**1 Claim, 4 Drawing Sheets**

FIG. 1  
(PRIOR ART)

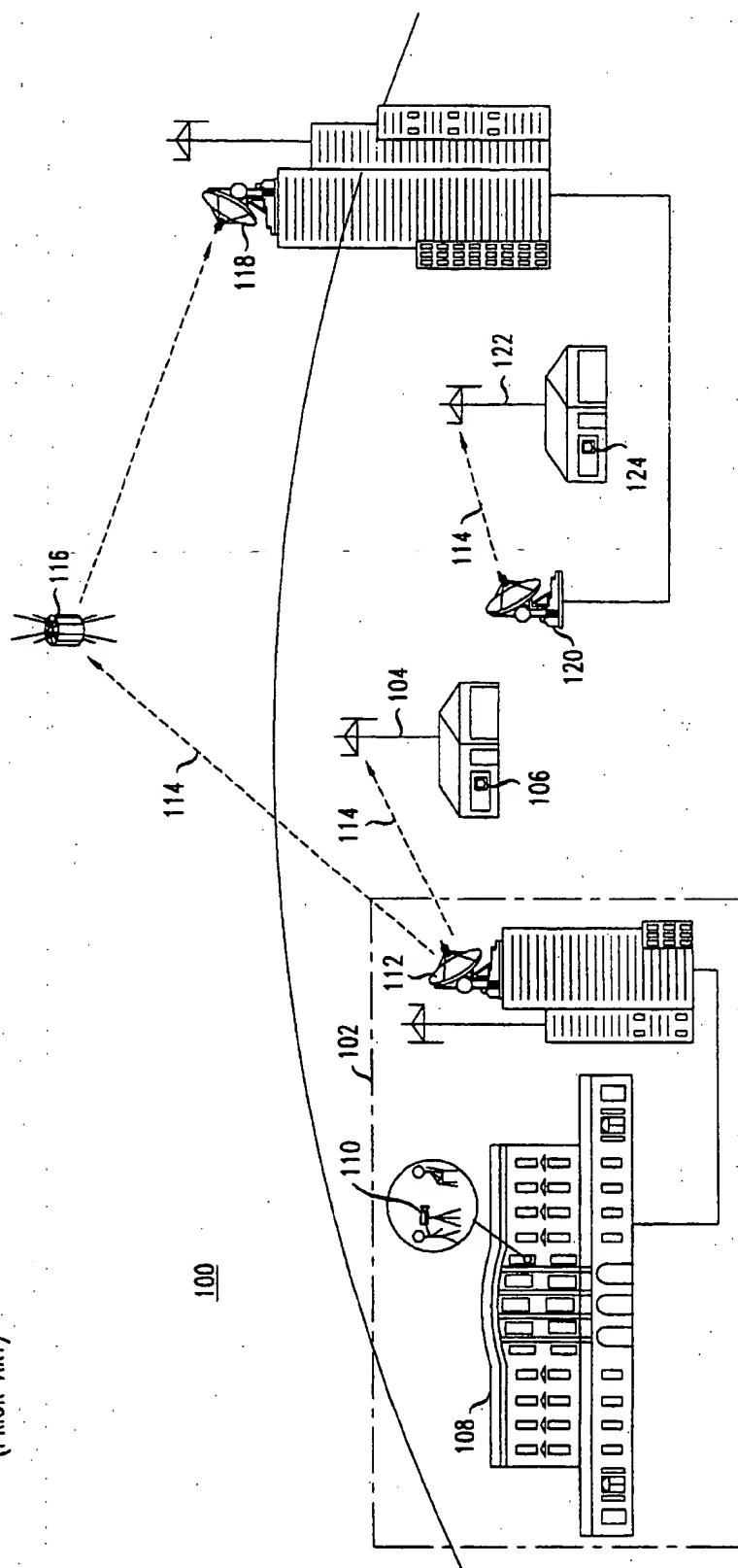


FIG. 2  
(PRIOR ART)

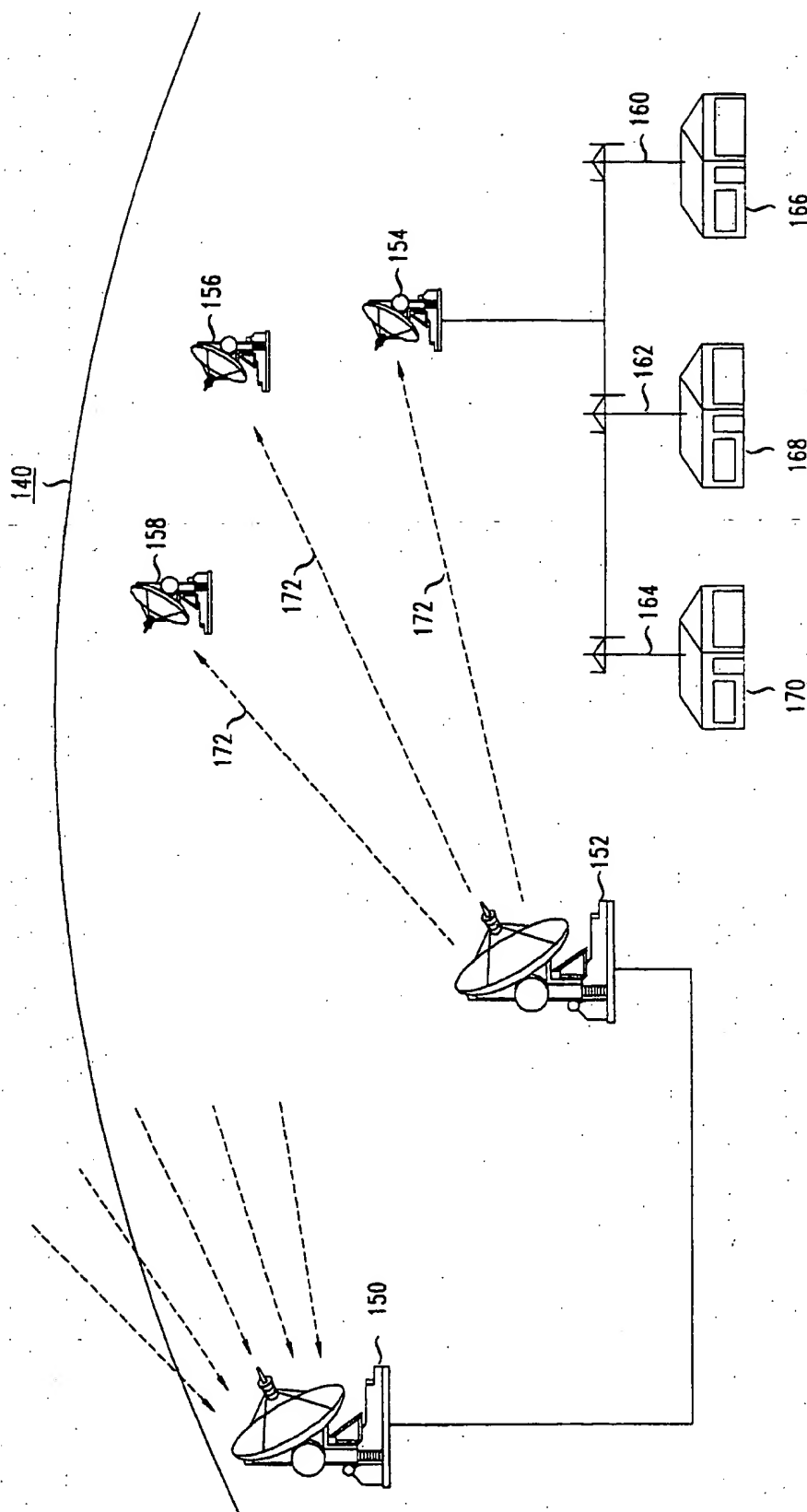


FIG. 3

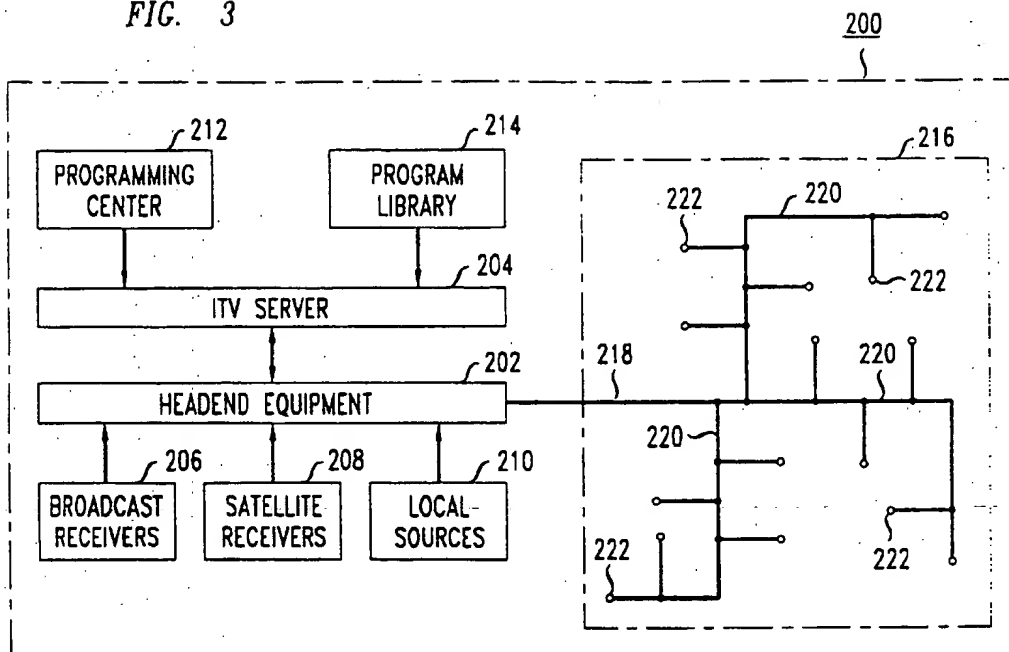


FIG. 4

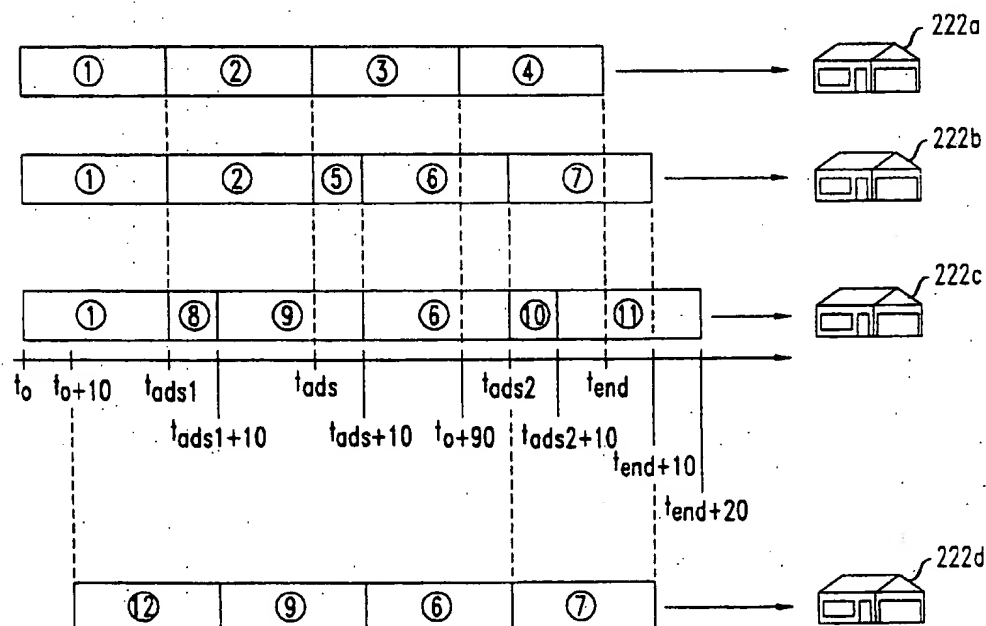
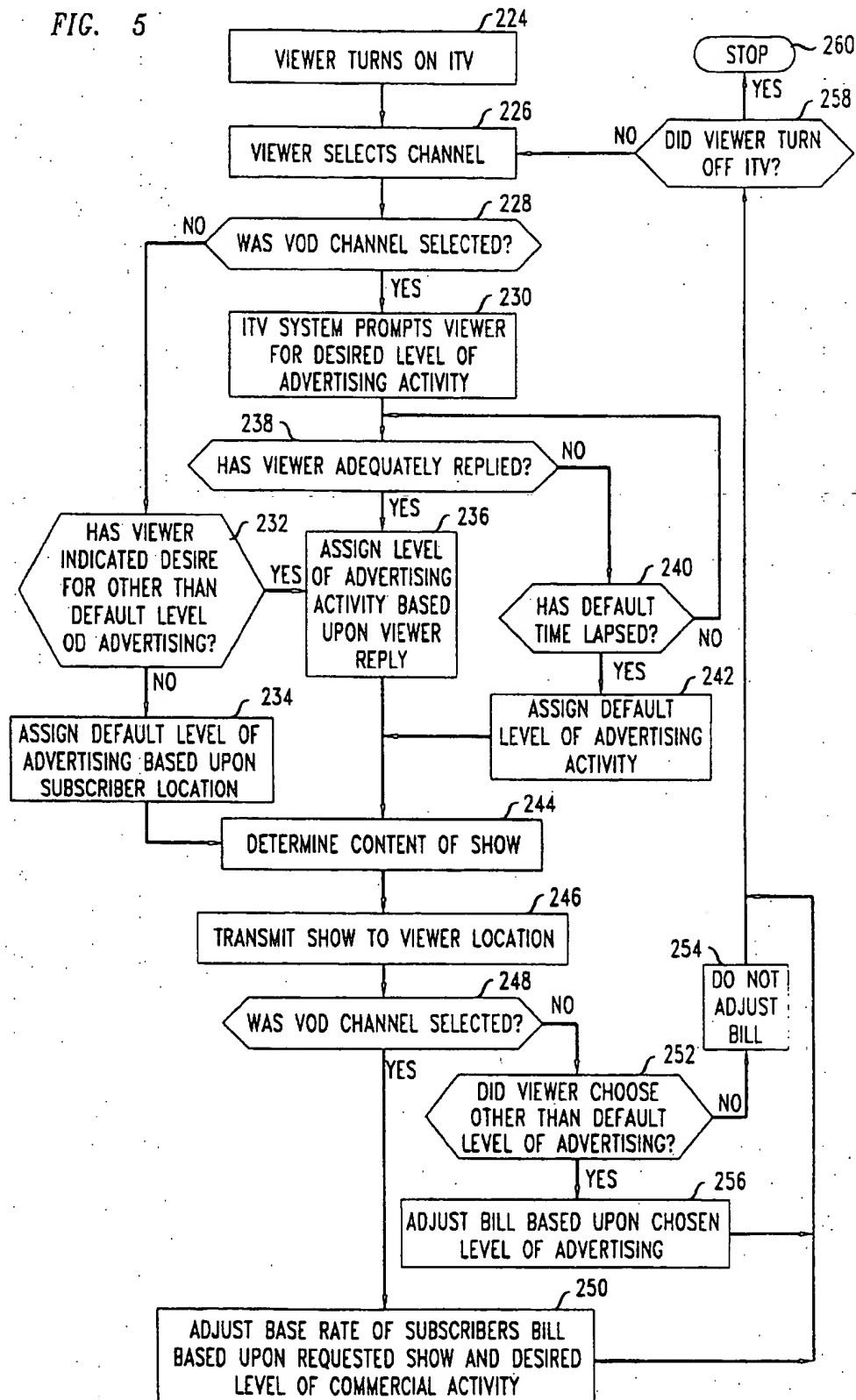


FIG. 5



## METHOD OF ADVERTISEMENT SELECTION FOR INTERACTIVE SERVICE

### FIELD OF THE INVENTION

The invention relates to interactive television. More particularly, the invention relates to the sending of and billing for interactive shows.

### BACKGROUND OF THE INVENTION

Today's world of television ("TV") comprises "broadcast" TV and conventional "cable" TV. Broadcast TV is typically called "free" TV since it is broadcast through the air and any antenna may be able to pick up broadcast signals. Conventional cable TV is a service that uses a cable as the transmission medium for signals.

A common thread between broadcast TV and conventional cable TV is that signals travel in one direction. For example, in broadcast TV the viewer cannot send a signal through the air back to the transmitter. Also, in conventional cable TV, the viewer cannot send a signal through the cable wire back to the cable TV company.

In broadcast TV and conventional cable TV, most TV shows provide advertisements to the viewing audience. A few exceptions may be, for example, premium channels on a conventional cable TV system and public TV (e.g., channel 13). However, even these "exceptions" have "advertisements" in the sense that they promote other premium channels available through the conventional cable TV system and ask viewers to make a donation to "support" the station, respectively.

Some viewers are of the opinion that advertisements provide important information about products and services. These viewers typically want to see advertisements.

Some viewers are of the opinion that advertisements are a waste of time. These viewers typically do not want to see any advertisements. Many of these viewers will tape a show on their video cassette recorder (VCR) and watch it later in about two thirds the normal viewing time by simply "fast-forwarding" through all of the advertisement.

Some viewers are willing to tolerate a few advertisements. Typically, these viewers are more interested in advertisements than some but less interested in advertisements than others.

### SUMMARY OF THE INVENTION

We have invented a technique for an interactive television ("ITV") system wherein viewers are allowed to select a desired level of advertisements with which they are provided. ITV systems are similar to conventional cable TV systems in that the transmission medium is a cable rather than the air. However, in contrast to both broadcast TV and conventional cable TV wherein signals travel only in one direction, ITV systems are characterized by the capability of having signals travel in two directions (both from the ITV system to an interactive services subscriber location and from the interactive services subscriber location to the ITV system). The technique comprises transmitting to a interactive services subscriber location a program and a set of advertisements (collectively referred to as a "show"). There are a number of ways in which this may be accomplished, some of which will be mentioned in the "Detailed Description" section. The set of advertisements is selected based upon an input from a user associated with the interactive

services subscriber location. For example, if the amount of advertisements is expressed as a number, such as three, the ITV system will select a set of three advertisements. Likewise, if the amount of advertisements is expressed in terms of time, such as five minutes of advertisements, the ITV system will select a set of advertisements that take approximately five minutes to display. The input comprises an indicator of an amount of advertisements in the set of advertisements. Advantageously, the ITV system allows viewers that desire to view many advertisements to so specify and thus, to view numerous advertisements. Also advantageously, the ITV system allows viewers that desire to view no advertisements to so specify and thus, view a show containing no advertisements (e.g., the "set" of advertisements is the null set). Also advantageously, the ITV system allows viewers that desire to view a few advertisements to so specify and thus, view a show with a moderate amount of advertisements.

Also advantageously, the ITV system allows for adjusting an amount of a bill of a subscriber to interactive television services based upon the amount of advertisements viewed in a show. Typically, the more advertisements that are viewed, the less the subscriber's bill will be for that show. Typically, subscribers are billed on a monthly basis.

Also advantageously, the ITV system allows for adjusting an amount of a bill of a subscriber to interactive television services based upon the level of advertisements sent to the interactive services subscriber location on a regular basis.

Other advantages of the present invention will be apparent from the drawings and the remainder of the specification.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a broadcast TV system.

FIG. 2 shows a conventional cable TV system.

FIG. 3 shows an example of an ITV system that is capable of implementing the present invention.

FIG. 4 shows an example of shows for a number of users assembled by the present invention.

FIG. 5 shows a simplified version of a flow chart that gives an example of how the amount of advertisements is determined.

### DETAILED DESCRIPTION

ITV systems represent a great departure from previous broadcast TV systems and conventional cable TV systems. However, prior to discussing the present invention in its ITV environment, it will be useful to provide a brief description of the broadcast TV and conventional cable TV systems shown in FIGS. 1 and 2, respectively.

FIG. 1 shows a broadcast TV system 100 comprised of a broadcast system 102, an antenna 104, and a television 106. Although there are many broadcast systems in a broadcast TV system 100 (at least one for each broadcast channel), only broadcast system 102 is shown for the sake of simplicity. Suppose one wishes to watch a presidential address from the White House 108 carried on broadcast TV. First, a broadcast TV station would place a camera 110 at the White House 108 to film the president. The camera 110 is connected to a transmitter 112. The transmitter 112 broadcasts signals 114. Locations in the Washington D.C. area may be able to pick up the signals 114 with the antenna 104. However, other locations, for example, in New York, would pick up the signals 114 after they have been transmitted to a satellite 116, then to a local receiver 118 in, for example,

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Initially, the timing scheme described above appears to present difficulty due to creating staggered playing times for a single VOD: Staggered playing times refers to instances wherein viewers at more than one location, e.g., 222a-222c, starts a VOD at the same time (unlike staggered starting times) but do not finish at the same time due to some factor

The concept of a virtual channel will now be briefly explained. However, more detailed discussions of virtual



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(e.g., differing amounts of advertising desired at different locations). However, those skilled in the art will realize that the concept of staggered starting times, as described in U.S. patent application Ser. No. 07/965,493 entitled "Interactive Television Multicasting" filed Oct. 23, 1992 with particular reference to FIGS. 5 and 6, may be applied to staggered playing times within a VOD as in the above example. For example, if the VOD was shown every ten minutes, viewers at location 222b could be transferred to receive the same signals as viewers at a different location, e.g., 222d, that requested no advertisements and also requested to begin the VOD at time  $t_{0+10}$ . This is because at time  $t_{0+10}$ , viewers at location 222d will begin to view the 101<sup>st</sup> minute of the VOD just like viewers at location 222b (because viewers at location 222d will have seen 100 minutes total [ $t_{0+10}$  minus  $t_{0+10}$ ] without any advertisements).

The VOD application of the present invention described above is only by way of example. Those skilled in the art will realize that the VOD application may be modified from the above example in a number of ways including, but not limited to, involving more or fewer viewers for the same video, involving more or fewer viewers for different videos, involving different length advertising segments (e.g., four five minute segments instead of two ten minute segments for location 222c), and/or providing the VOD to non-viewers (e.g., a VCR) if legally permissible.

The VOD application of the present invention may also utilize a feature wherein the viewer is notified that an upcoming set of advertisements is about to be shown in, e.g., two minutes. The viewer may also be supplied with the length of time needed to view the upcoming set of advertisements (e.g., five minutes). The viewer may then be prompted for a response as to whether the viewer desires to "cancel" that set of advertisements. The ITV system 200 would then react according to the response.

The VOD application of the present invention may also be used to identify a set of shows transmitted on behalf of a subscriber to interactive television services during a billing period. Typically, the billing period would be monthly. Each VOD could be charged to an account of the interactive services subscriber locations, e.g., 222a-222d, based upon the amount of advertising viewed with each VOD. Typically, the more advertising presented, the lower the charge for the VOD. Thus, in the above example, the accounts corresponding to locations 222a through 222d may be billed \$5.00, \$4.00, \$3.00, and \$5.00, respectively, for the requested VOD service provided.

Further, the present invention is not limited to VOD applications and may, in fact, be utilized by a subscriber that does not use request a VOD. For example, a provider of interactive services may have three basic monthly rates. A first rate would be charged to those accounts indicating a desire for no advertisements; regardless of whether they are requesting a sporting event, a re-run of a situation comedy, the news, etc. . . . A second rate would be charged to those accounts indicating a desire to view a minimal amount of advertisements. A third rate would be charged to those accounts indicating a desire to watch a more than minimal amount of advertisements. In this situation, the first rate would be the highest monthly rate and the third rate would be the lowest monthly rate. The rate could be adjusted up or down if a viewer at the interactive services subscriber location indicates that for a particular show or time frame, an amount of advertisements different than the "default" monthly amount is desired. The charge to the account could, for example, be adjusted on a pro-rata basis between, e.g., the first rate and the second rate. Thus, a requested show

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need not be limited to a VOD but may include simply turning on one's ITV to a sporting event, a re-run of a situation comedy, the news, etc. . . .

Regardless of whether the present invention is used in a VOD application or otherwise, FIG. 5 shows a simplified version of a flow chart that gives an example of how the amount of advertisements is determined. In fact, it also shows an example of how a subscriber's bill may be adjusted based upon shows viewed. Box 224 indicates that a viewer has turned on an ITV. Box 226 indicates that the viewer has selected a channel. Decision box 228 determines whether the viewer has selected a VOD channel. If so, the viewer is prompted for a desired level of commercial activity as shown in box 230. If not, decision box 232 determines if the viewer has indicated a desire for a level of advertising other than the default level for that FIG. 5 shows a simplified version of a flow chart that gives an example of how a subscriber's bill amount is determined. This may be done in a number of ways. One example would be to prompt the viewer for any desired changes. Another example would be to only change the default level if the viewer enters a command without being prompted. If the default level is applicable, box 234 assigns this level. Otherwise, box 236 assigns the level of advertising activity based upon the viewer reply. If the VOD channel is selected, decision box 238 determines whether the viewer has adequately responded to the prompt from decision box 230. If the viewer does not adequately respond within a predetermined amount of time (e.g., thirty seconds), decision box 240 and box 242 assign a default level of advertising to be viewed with the requested show. However, if the viewer makes an adequate response, box 236 assigns the level of advertising activity based upon the viewer reply. Next, boxes 244 and 246 determine the content of the show and transmit it to the interactive television services subscriber location, e.g., 222a. Next, billing for a VOD is determined by boxes 248 and 250. However, if the VOD channel was not selected, billing is determined by boxes 252, 254, and 256. Finally, boxes 258 and 260 are shown to account for the viewer selecting another channel (or keeping tuned to the same channel for the next show) or turning off the ITV, respectively. Those skilled in the art will realize that many modifications may be made to the above description.

Although the invention has been described with respect to an ITV environment running a VOD application, those skilled in the art will realize that the show may be anything that is requested. This includes, but is not limited to, such things as audio-visual shows, interactive shows, audio shows, shopping services, transactional shows, etc. . . .

We claim:

1. A method of sending a set of signals to an interactive service subscriber location, the method comprising:

- (a) prompting a user at the interactive service subscriber location to enter a desired level of advertising activity;
- (b) waiting a predetermined amount of time for a response from the user; and
- (c) after the predetermined amount of time has elapsed, assigning a default entry to the desired level of advertising activity;
- (d) based upon the desired level of advertising activity, selecting a set of advertisements; and
- (e) sending to the interactive service subscriber location, the set of signals representing a program and the set of advertisements.

\* \* \* \* \*



US005515098A

**United States Patent** [19][11] **Patent Number:** **5,515,098****Carles**[45] **Date of Patent:** **May 7, 1996**[54] **SYSTEM AND METHOD FOR SELECTIVELY  
DISTRIBUTING COMMERCIAL MESSAGES  
OVER A COMMUNICATIONS NETWORK***Primary Examiner*—James J. Groody  
*Assistant Examiner*—Sherrie Hsia  
*Attorney, Agent, or Firm*—Darby & Darby[76] **Inventor:** John B. Carles, 40 E. 10th St. - Apt.  
5H, New York, N.Y. 10003[57] **ABSTRACT**[21] **Appl. No.:** 303,352

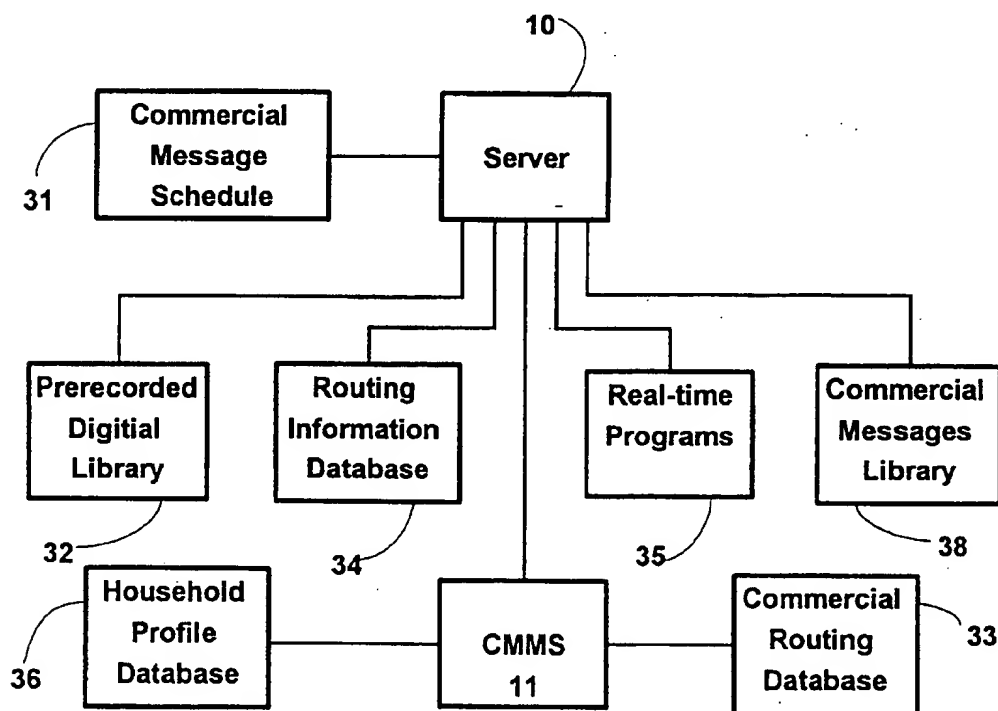
A device and method of distributing commercial messages to an individually addressable subscriber terminal ("converter") on a network is provided. A server, located on the network, selectively tags commercial messages with routing information and converter addresses, and transmits the messages on the network to be received and displayed by the addressed converters. The addresses are selected based on information stored in a database related to demographic and other information relating to the members of the household of the subscriber. The server sends selected commercial messages to selected households.

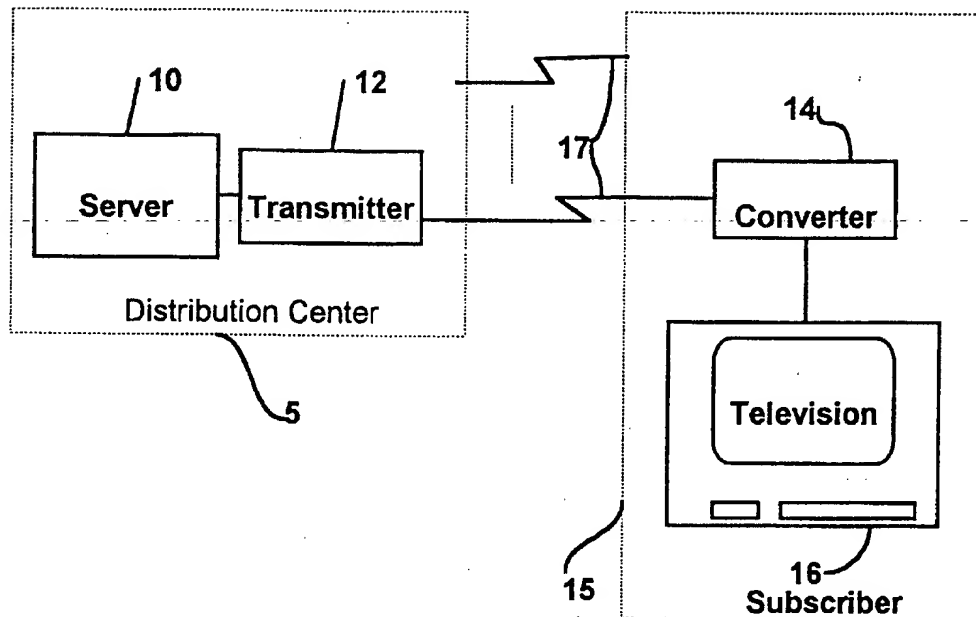
[22] **Filed:** Sep. 8, 1994[51] **Int. Cl.<sup>6</sup>** ..... H04N 7/10[52] **U.S. Cl.** ..... 348/8; 348/6; 455/3.3[58] **Field of Search** ..... 348/1, 6, 8, 10,  
348/12; 455/2, 3.3, 4.2, 5.1; 358/56, 84;  
H04N 7/10[56] **References Cited**

U.S. PATENT DOCUMENTS

5,155,591 10/1992 Wachob ..... 348/9

7 Claims, 4 Drawing Sheets



**Fig. 1**

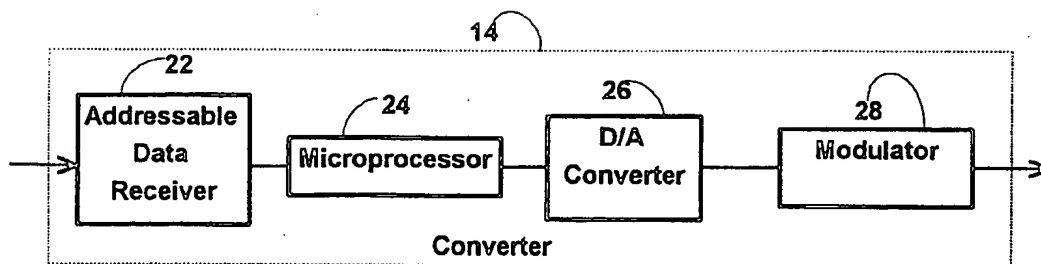


Fig. 2

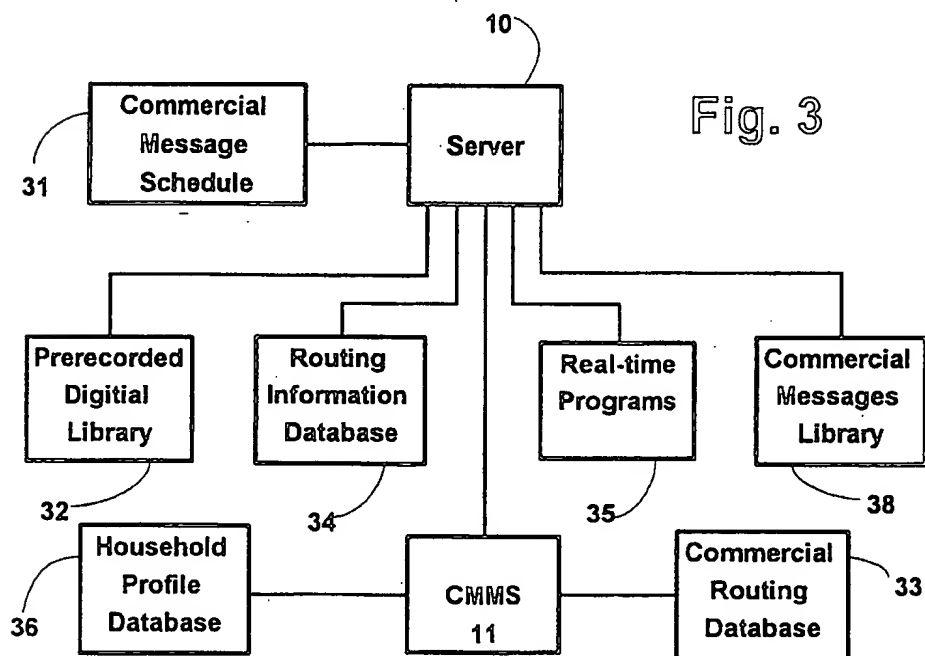


Fig. 3

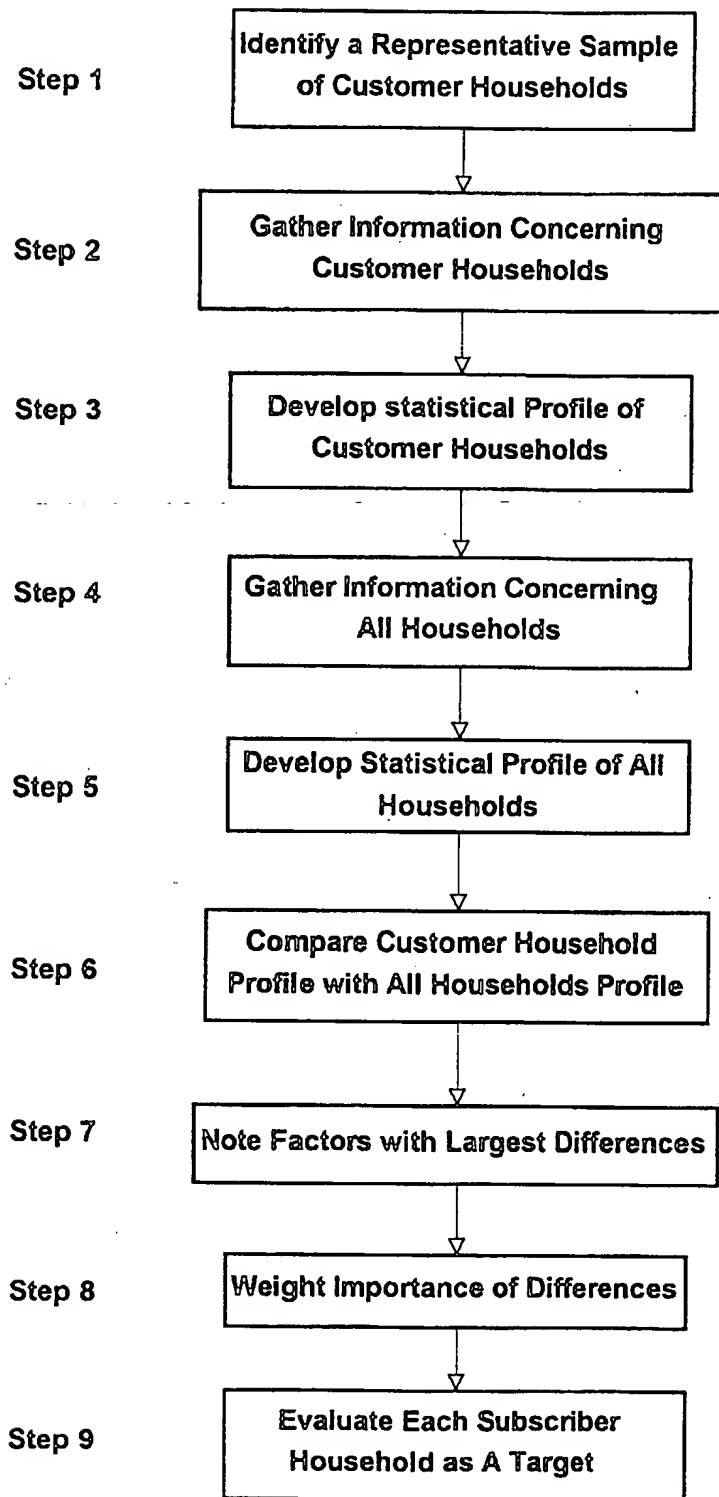
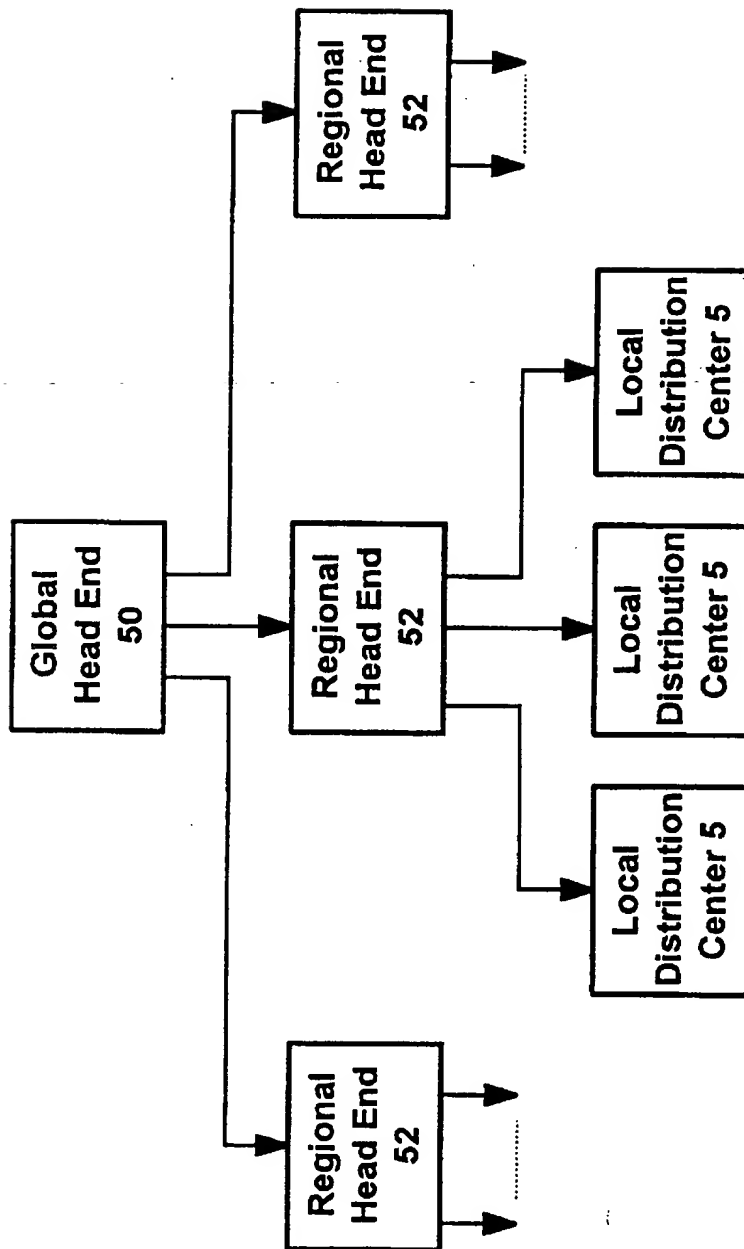


Fig. 4

**Fig. 5**

# SYSTEM AND METHOD FOR SELECTIVELY DISTRIBUTING COMMERCIAL MESSAGES OVER A COMMUNICATIONS NETWORK

## FIELD OF THE INVENTION

The present invention relates generally to on-demand consumer ordered television and, more particularly, concerns a method for distributing advertising and commercial messages in such an environment.

## BACKGROUND OF THE INVENTION

The broadcast and advertising industries have historically focused on the ability of programming to predictably deliver a mass audience of people defined by broad demographics (e.g. women 35-49 with above average income, men 18-34) as a basis for selling broadcast advertising. This system works in the current configuration of the broadcast industry, and specifically television, because there are a limited number of network channels and local stations. Further, they deliver a limited programming menu to the public, thus, neither the public nor the advertiser has many choices. Even with the advent of cable television, programming is still limited, so that audiences can be predicted.

Through the use of fiber optic cable and individual household satellite signal receptors, it is anticipated that a 500+ channel environment will soon be common. Further, with advances in high capacity video storage and movement toward digital format for television transmission, on-demand television is on the horizon, whereby a subscriber may select between viewing a program at the time of transmission or viewing a program stored in a digital library at a central location in a cable network at a time of the viewer's choosing. With the anticipated increase in viewing options, efficient delivery of defined audience for advertisers through the sale of in-program participation or pre-set time slots on a given channel will become increasingly difficult.

U.S. Pat. No. 5,260,778 to Kaufman, the disclosure of which is herein incorporated by reference, discloses an apparatus for selective distribution of messages over a communications network. A subscriber's converter is addressed according to a multilevel grouping structure. For example, in a two level grouping structure, each converter is assigned as a member of a primary group and may also be assigned to one or more subgroup. Thus, the head end can target a group of subscribers by tagging the appropriate group identifier to the message. Although this apparatus might be useful in a cable network with a large number of channels, it would not be appropriate in a more dynamic viewing on-demand environment where each converter may need to be individually addressed.

It is an object of the present invention to provide a method and system for dynamically distributing commercial programming to selected target households.

It is another object of the invention to distribute commercial programming to particular subscribers based on predetermined characteristics.

In accordance with the present invention, a system and method are provided for distributing commercial messages to an individually addressable subscriber terminal ("converter") on a network. Commercial messages to be distributed over the network contain embedded information identifying categories of recipients for each message. A server, centrally located on the network, selectively tags commercial messages with the converter addresses of subscribers,

satisfying the identifying categories. The commercial messages are then transmitted over the network for receipt and display by a television receiver connected to the addressed converters. The addresses are selected by the server based on information stored in a database related to demographic and other information relating to the household of the subscriber in comparison to the same information relating to households which are actual customers of the product or service which is the subject of the commercial.

## BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features of the present invention will be more readily apparent from the following detailed description of preferred embodiments taken in conjunction with the attached drawings wherein:

FIG. 1 is a block diagram of the system for distributing commercial messages;

FIG. 2 is a block diagram of the converter of the present invention;

FIG. 3 is a block diagram of a preferred embodiment of a distribution center in accordance with the present invention;

FIG. 4 is a flowchart of the method for evaluating subscribers for the purpose of targeting commercials to the most receptive audience; and

FIG. 5 is a block diagram illustrating a preferred form for a wide area network embodying the present invention.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 is a general block diagram illustration of a preferred system in accordance with the present invention. A message distribution center 5 communicates with a plurality of subscribers 15 (one is shown) over a network medium 17. The network disclosed preferably uses high speed packet switching technology, preferably a synchronous transfer mode switching (ATM) of a known type. One skilled in the art will recognize that any of a number of conventional high speed networks could be used. The message distribution center 5 controls the distribution and transmission of selected television programs, including those broadcast by broadcast stations, digitally stored or recorded movies and programs, and commercial messages.

The message distribution center 5 includes a server 10 (described in more detail later) which produces a data stream containing the programming and commercial information being transmitted, as well as information controlling the distribution of programming and commercial information. This data stream is transmitted on the network medium 17. The server 10 preferably runs on a high speed processor (not shown). One skilled in the art will recognize that the message distribution center may include several high speed processors running several servers depending on the number of converters on the network 17. The message distribution center 5 also includes a transmitter 12 for transmitting the information produced by server 10 on the network medium. Thus, the function of the message distribution center 5 is to prepare and transmit data to the subscribers 15 over network medium 17.

Each subscriber 15 must have a converter 14 (described in more detail later) for receiving the transmitted data. Converter 14 extracts from the data a signal which is appropriate for display on television receiver 16.

As illustrated in FIG. 3, in creating the information stream, server 10 accesses several databases and libraries (32, 34, 38) to gather the information, and it can also provide analog or digital, real time programs 35, such as broadcast programs and cable programs. Server 10 accesses a prerecorded digital library 32 which is comprised of prerecorded programs in a compressed digital or other storage format. For example, the programs may be stored on different types of known storage media, such as CD ROM, laser disk, or magnetic tape. Also stored in library 32 is information concerning the time in each program at which commercial breaks occur, and the duration of each break. The same information also accompanies real time programs. In many types of programming, this information may be unnecessary, since breaks of fixed duration will occur at predetermined times.

In addition to providing programming information in its transmission stream, server 10 also provides commercial messages. Server 10 has access to a library of commercial messages 38, which contains all of its commercial messages stored in a convenient format. Each commercial message is a "smart commercial", in that it contains embedded information identifying the categories of recipients for the message. As is explained more fully below, this embedded information is utilized by a Commercial Message Management Server (CMMS) 11 to produce a set of subscriber addresses corresponding to each category of recipient identified by the embedded information.

In the process of incorporating commercial messages in its transmission stream, server 10 accesses its database and libraries and cooperates with CMMS 11 to create a commercial message schedule 31, which controls the selection and timing of those commercial messages from library 38 that will be inserted into the transmitted data stream. Whenever, server 10 selects programming for a particular subscriber, it also reserves space within the schedule 31 for the appropriate, accompanying commercial breaks. The actual messages inserted for each subscriber during each break are determined by CMMS 11 and are communicated to server 10 for insertion into schedule 31.

CMMS 11 accesses a commercial routing database 33, which includes information about required routing of commercial messages, and a household database (described in more detail below) containing statistical information related to individual subscriber households. Based upon information contained in commercial routing database 33 and information embedded in the commercial message (conveyed from server 10), CMMS 11 will select certain households or groups of households to receive certain commercial messages and will convey that information to server 10 for storage in commercial message schedule 31. The selection of households to receive commercial messages may be on the basis of household statistics in combination with requirements stored in commercial routing database 33, or the commercial messages may be associated with certain programming and/or certain viewing times and dates. When a break occurs in program material, commercial message schedule 31 determines which messages will be sent to each household, and server 10 will do so by embedding routing information from database 34 in its bit stream. Thus, each commercial message will have appropriate routing information associated with it.

Commercial routing database 33 keeps track of the routing requirements for commercial messages. It contains such information as how frequently each commercial message should be transmitted to each user or each group of users and the number of actual transmission of each message to each

user or group of users. This database may also associate certain commercial messages with certain programming or certain viewing time slots.

Any or all of the databases 33, 34, or 36 could be maintained and continually updated by a separate server (not shown) or by multiple servers. For example, database 36 could be maintained by a network of servers, each providing information about a group of households defining its region.

It is also contemplated that server 10, may, at times, be required to send no commercial message, but instead, to relinquish control to another source of a commercial message. This could occur, for example, when server 10 is part of a hierarchical network and time has been reserved for insertion of commercial messages by a local station below server 10. Server 10 would then insert no commercial message for a specified interval, but would begin inserting information immediately at the end of the interval.

From the preceding description, it will be appreciated that as determined from commercial message schedule 31, server 10 transmits information through transmitter 12, preferably after receiving a request for a particular program stored in library 32, or for an incoming real time program, from an individual subscriber (possibly a sub-server). Server 10 may also commence sending information instead, based on the day of the week and the time of day, and may route the same information to many subscribers. On a separate, preferably digital channel, server 10 transmits instructions to each subscriber controlling what channel it should access for its next commercial message. Server 10 routes each commercial message to a respective channel. When a commercial break is encountered in programming received by a subscriber, the subscriber's converter 14 adjusts to receive the commercial channel instructed by server 10. When the commercial break is over, converter 14 reverts to receiving the programming from server 10.

As described above, the subscriber must have a converter 14 connected to the network 17. Converter 14, as illustrated in FIG. 2, receives information addressed with the converter's network address via a known addressable data receiver 22. The information may include analog and digital signals. Only the processing of digital signals is illustrated in FIG. 2, it being assumed that the analog signals are processed by conventional equipment (not shown). The commercial messages and the control information related to them are digital signals in the preferred embodiment. The data receiver 22 preferably buffers and orders the digital information, stripping off all control and framing information (including routing information), in a high speed memory (not shown) for processing by microprocessor 24.

Microprocessor 24 accesses the buffered data and decompresses any digital program and commercial data, outputting the decompressed digital data as a digital signal to digital to analog converter 26. Digital to analog converter 26 converts the digital signal from microprocessor 24 to an analog signal. Modulator 28 modulates the commercial signal from the channel instructed by processor 10 to the appropriate television frequency for display on a particular channel being viewed by television receiver 16. One skilled in the art will understand that if the television is a digital television, the steps converting the digital signal to a modulated analog signal can be bypassed and the microprocessor would simply format the digital data to the format appropriate for the television. The function of the converter 14 is to receive information and output a signal appropriate for display on a television receiver.

As discussed above, commercial messages are selected by CMMS 11 based on profile household data stored in profile



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database 36. FIG. 4 is a flow diagram illustrating the preferred method utilized in CMMS 11 for determining the commercials to be sent to a subscriber. A number of categories of goods and services, which categories may be limited to specific brands, are predefined, and these same categories are used as part of the embedded information in smart commercials. Using propriety or syndicated research, a representative sample of "customer" or high frequency user households for the given product/service category or brand is selected (step 1). This sample is large enough to support statistical analysis for projection to all US households, i.e. a statistical sample. Using demographic, census and survey data, and other available data, information about these households is gathered (step 2). This information is compiled into a statistical profile of customer households (step 3). Also, the same data is gathered with respect to all households (step 4) and a statistical profile of all households is created (step 5).

In an effort to characterize target households for the product or service, the profile of the customer households is compared or correlated to the profile of all households (step 6). Demographic differences are then noted (step 7) and weighted in importance (step 8) to establish a rating for each household for each category of goods/services (step 9). For example, weighting may be based on degree of difference and frequency of occurrence. As an example, for a given product, a rating,  $y$ , may be established as follows:

$$y = 0.040425*A + 0.045920*B + 0.043766*C + 0.036453*D + 0.033336*E + 0.015284*F + 0.012396*G + 0.023163*H + 0.027470*I + 0.018362*J + 0.016994*K - 0.247068.$$

Table I defines what each index variable A through K represents in a preferred embodiment. Every subscriber is scored using the equation above. The higher the score, the more likely the subscriber is to buy the corresponding product or service.

TABLE I

VARIABLE	INDEX
A	Gender
B	Occupation
C	Length of Residence
D	Number of Automobiles
E	Vehicle Type
F	Head of Household Age
G	Household Income
H	Median Rent: All Renter Occupied Housing
I	Percent of Population: Foreign Born
J	Percent of Population: Age 35-44
K	Percent of Population: Professional/Managerial Positions

Variables A-G are variables specifically related to the individual subscriber's household whereas H-K are variables related to the location of the subscriber's home. As can be seen from this particular equation, occupation, length of residence, and gender are the most important factors for this particular product.

The possible values for variables A-K are given in Tables II-XII. The columns are defined as follows:

VALUE: possible conditions that a variable may assume.  
 PERCENT OF TOTAL: percent of total analysis sample having the given value. The entries in this column always add up to 100%.

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PERCENT OF TARGETS: percent of high frequency or target users meeting the value condition. Unlike Percent of Total, Percent Targets will not add up to 100%. However, the products of percent of target users for each category with the "Percent of Total" value (the size of the category in relation to the size of the analysis sample), will sum to the percent of target users in the analysis sample.

INDEX VALUE: the ratio between the entry in the "percent targets" column and the "total" entry in the same column.

TABLE II

Gender			
VALUE	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Unknown, Female	14.64%	1.99%	0.3042
Male	85.36%	7.32%	1.1193
TOTAL	100.00%	6.54	1.0000

TABLE III

Occupation			
VALUE	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Retired, Unskilled, Military, Unknown	12.89%	2.11%	0.3230
Blue Collar/Clerks	56.42%	4.63%	0.7086
Other	5.01%	5.05%	0.7723
White Collar	25.68%	13.23%	2.0243
TOTAL	100.00%	6.54%	1.0000

TABLE IV

Length of Residence			
VALUE	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Less Than 6 Years, Unknown	39.53%	4.88%	0.7470
7-14 Years	21.51%	6.34%	0.9698
14 or More Years	38.96%	8.32%	1.2733
TOTAL	100.00%	6.54	1.0000

TABLE V

Number of Automobiles			
VALUE	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Unknown	21.93%	3.25%	0.4967
0	12.95%	3.96%	0.6055
1	30.61%	4.60%	0.7037
2	22.90%	10.21%	1.5618
3 Or More	11.61%	13.48%	2.0632
TOTAL	100.00%	6.54	1.0000

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TABLE VI

VALUE	Vehicle Type		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Unknown	34.97%	3.52%	0.53484
Standard/Intermediate-Reg. Compact	24.35%	5.27%	0.8070
Other Compact, Subcompact	10.36%	7.06%	1.0796
Pass-util., Economy, Sporty	20.76%	8.56%	1.3103
Luxury	9.55%	15.82%	2.4202
TOTAL	100.00%	6.54	1.00

TABLE VII

VALUE	Head of Household Age		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
18-24/75+: SPC, 18-44: INF	18.50%	2.41%	0.3689
65-75: SPC, 55+: INF	15.99%	4.35%	0.6660
25-44: SPC, 45-55: INF	33.93	7.38%	1.1284
45-64: SPC	31.58%	9.16%	1.4009
TOTAL	100.00%	6.54%	1.0000

\*SPC - Specific age data is available for the head of household  
 INF - Inferred data, based on neighborhood characteristics are used for age determination

TABLE VIII

VALUE	Household Income		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Less Than \$15,000	8.37%	2.31%	0.3529
\$15,000-\$19,999	5.60%	3.05%	0.4665
\$20,000-\$29,999	13.12%	3.45	0.5275
\$30,000-\$39,999	16.82%	5.06%	0.7743
\$50,000-\$49,999	15.73%	6.49%	0.9936
\$50,000-\$74,999	22.16%	7.25%	1.1098
\$75,000-\$99,999	9.58%	11.66%	1.7838
100,000 Or More	8.62%	13.02%	1.9926
TOTAL	100.00%	6.54	1.0000

TABLE IX

VALUE	Median Rent: All Renter Occupied Housing		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Less Than \$129	7.74%	2.62%	0.4004
\$130-\$219	34.09%	3.70%	0.5665
\$220-\$289, Missing Data	30.39%	6.55	1.0019
\$290-\$349	12.53%	9.19%	1.4065
\$350-\$439	9.51%	11.37%	1.7403
440 Or More	5.74%	14.76%	2.2581
TOTAL	100.00%	6.54	1.0000

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TABLE X

VALUE	Percent of Population: Foreign Born		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Less Than 1.00%	14.70%	3.59%	0.5499
1.00%-2.99%	22.98%	4.86%	0.7437
3.00%-6.99%, Missing Data	31.67%	6.60%	1.0101
7.00% Or More	30.65%	9.13%	1.3976
TOTAL	100.00%	6.54%	1.0000

TABLE XI

VALUE	Percent of Population: Age 35-44		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Less Than 7.00%	4.21%	3.08%	0.4717
7.00%-9.99%	22.59%	4.54%	0.6943
10.00%-13.99%, Missing Data	45.07%	5.80	0.8881
14.00%-15.99%	13.08%	8.52%	1.3028
16.00% Or More	15.05%	10.97%	1.6783
TOTAL	100.00%	6.54	1.0000

TABLE XII

VALUE	Percent of Population: Professional/Managerial Positions		
	PERCENT OF TOTAL	PERCENT TARGETS	INDEX VALUE
Less Than 11.00%	9.54%	3.51%	0.5376
11.00%-19.99%	25.19%	4.02%	0.6148
20.00%-217.99%, Missing Data	25.40%	4.68	0.7165
28.00%-32.99%	11.64%	7.01%	1.0724
33.00%-41.99%	14.73%	10.14%	1.5515
42.00%-49.99%	7.91%	12.08%	1.8484
50.00% Or More	5.58%	13.14%	2.0112
TOTAL	100.00%	6.54	1.0000

When an advertiser is purchasing advertising time, it can specify a cut-off percentile for homes to receive its message. Thus if an advertiser wants to target the 30th percentile (top 30%) of subscribers (as evaluated by the above equation) for its product, the server 10 will only send the commercial messages to subscribers evaluated as being within the top 30 percent. This permits advertisers to spend advertising funds more efficiently.

FIG. 5 is a block diagram illustrating a preferred configuration for a hierarchical wide area network embodying the present invention. Global head end 50 is a distribution center for the entire network and performs substantially the same functions as distribution center 5 of FIG. 1. Global head end 50 communicates with a plurality of regional head ends 52, also similar to distribution center 5, each of which, in turn, communicates with a distribution center 5. It should be appreciated, however, that there may be one or more addi-

tional levels of head end between regional head ends 52 and local distribution center 5.

The head ends 50, 52 etc. are similar to the regional distribution center 5, except that each maintains databases for its full region of responsibility. It will be appreciated that Global head end databases could be entirely derived at the Global head end, with corresponding portions of the databases being sent to the appropriate lower level of distribution center. Alternately, each level of distribution center could maintain its own databases, with information being transmitted upwardly to the higher levels, where an appropriate cumulative database would be assembled. The essential difference between a head end and a local distribution center is that only the local distribution center produces converter addresses to communicate directly with subscribers.

A head end transmits downwardly information containing smart commercials, but the smart commercials contain routing information indicating groups to receive the commercial. This is accomplished by defining a target group code representative of each type of product or service that may be covered by a commercial and, as routing information, transmitting the target group code or codes associated with the commercial, together with a percentile indication. A commercial message for luxury automobiles might therefore include the target group code for luxury automobiles, together with a "30", indicating that the commercial is to be transmitted to the thirtieth percentile or top 30 percent of the customer group targeted for luxury automobiles. This is the same type of information embedded in commercials stored in Library 38 of FIG. 3.

It should be appreciated that in the system of FIG. 5, advertising information may be inserted at any level. For example, programming may be transmitted downwardly from Global head end 50 with certain commercial message slots already filled, and regional head ends 52 may then also fill other commercial message slots. Thus, by the time certain programming reaches a local distribution center 5, many of the commercial message slots may already be filled. It is then up to the local distribution center to receive and strip the group distribution codes accompanying each commercial message inserted at a higher level and to substitute the appropriate routing information for the actual subscribers in its region which meet that description. Any commercial slots in the programming which have not been filled at a higher level are, of course, available to be filled by any lower level distribution center.

While the present invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed:

1. An apparatus for selectively distributing messages over a communications network comprising:

a controller for communicating over the network with a plurality of subscriber terminals in a plurality of subscriber households served by the communications network, each of said subscriber terminals having a network address;

a reservoir of data operatively associated with said controller, said reservoir containing network addresses of said subscriber terminals and subscriber profile data associated with each of said subscriber households and including demographic data;

a source of commercial messages;

selection means operatively associated with said controller for selecting at least one of said commercial mes-

sages for transmission to at least one of said subscriber terminals based on the subscriber profile data associated with said at least one subscriber terminal; and

identifying means operatively associated with said controller for identifying the selected at least one commercial message with the network address of said at least one subscriber terminal;

said controller causing the transmission, over said network from said source to said at least one subscriber terminal, of commercial messages identified with the network address of said at least one subscriber terminal.

2. An apparatus as in claim 1 wherein said commercial messages provided by said source contain information identifying at least one characteristic of a household intended to receive the commercial message.

3. An apparatus as in claim 1 wherein said reservoir of data further comprises target household profile data identifying characteristics of actual customers of the subject matter of said at least one commercial message, and means for comparing the subscriber's profile data and said target profile data, said selection means selecting commercials for transmission to a subscriber terminal in relationship to the comparison between that subscriber's profile data and the target profile data.

4. An apparatus in accordance with claim 2 further comprising means for generating a target household profile data by comparing data representative of the general population of households and customer household data representative of actual customers of the subject matter of said at least one commercial message.

5. A method for selectively distributing commercial messages across a communications network to at least one of a plurality of subscriber terminals in subscriber households having a network address comprising the steps of:

identifying each of a collection of stored commercial messages with a product code representing characteristics of a subscriber household profile common to actual customers of the subject matter of that commercial message which the code identifies;

prioritizing said plurality of subscriber terminals with respect to each product code, based on the conformance of subscriber household profile data for each of said plurality of subscriber terminals to the characteristics represented by each product code; and

controlling the transmission of a commercial message from said collection to said subscriber terminals so that only terminals of a specified priority relative to the product code receive the commercial message identified with the product code.

6. The method of claim 5 wherein the specified priority is included in said product code.

7. The method of claim 6 wherein the step of prioritizing said plurality of subscriber terminals comprises the steps of:

with respect to each product code, comparing profile data representative of customer households with profile data representative of all households, producing a weighting factor with respect to each difference characteristic related to the frequency of occurrence;

calculating a subscriber's priority with respect to the product code by analyzing the respective subscriber's household profile for the presence of difference characteristics and adding the corresponding weighting factor to the subscriber's priority when a difference characteristic is present.

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